

Work Order ID 110105

110105

Page 1

December-17-13 9:15:07 AM

Item ID: D350-748-201

Accept

N900040100

Setup Start

NS1

Revision ID:

Item Name: Aft Crosstube

Stop

NS2

Start Date: 12/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 12/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: MCS Date: 13-12-19

Tooling:

Date:

Run Start

NR1

QC: Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
D350-748-241	G

* SP

100

0.00

100

DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-201 CHG003

DAS
31
9-89

14-03-20

1

110

0.00

110

BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

*****UNDER BEND .225" PER SIDE*****

*****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS*****

ITW

14-02-04

Work Order ID 110105

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Page 2

Item ID: D350-748-201 Accept ***N9000040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Aft Crosstube
 Start Date: 12/17/13 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 12/17/13 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

120	QC6- Inspect dimensions to drawing	0.00							
120									
QC	Memo	0.00							
Quality Control	***USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS***								

125		0.00							
125									
Outsource1	Memo	0.00							
Outsource process - Heat Treat	ISSUE P/O TO METCOR: <u>22884</u>								
	Stress relief								
	Heat treat crosstube as per QSI010 4.3 within 12h after bending								

126	Receive & Inspect for Damage & Mat'l Certs	0.00							
126									
Packaging	Memo	0.00							
Packaging									

CX 14/02/04 (1)

P442/6 (1)

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Item ID: D350-748-201

Revision ID:

Item Name: Aft Crosstube

Start Date: 12/17/13 Start Qty: 1.00

Required Date: 12/17/13 Req'd Qty: 1.00

Reference:

Accept

N900040100Setup Start ***NS1***Stop ***NS2***

Cust Item ID:

Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start ***NR1***Stop ***NR2***Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

130

0.00

130

Crosstubes

Crosstubes

Crosstubes

Memo

0.00

2- Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs,
Set-up drill table as per QSI 010

3 -Deburr

4- Engrave Part # and Batch # as per Dwg D350-748-241

5-Remove all marks from tube within limits of D350-748-241

140

0.00

140

QC

Quality Control

QC6- Inspect dimensions to drawing

Memo

0.00

DAS

27

8-89

14/2/20

14-02-20

110/23

14/02/18

1

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Item ID: D350-748-201

Accept

N9000040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Aft Crosstube

Start Date: 12/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 12/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Run Start

NR1

Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop

NR2

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

150

Outsource process-Cadplate per QSI017 4.1.9.1

0.00

150

Outsource3

Memo

0.00

Outsource process - Cad plate

Issue P/O: 23080
Stress relief at 375° for 5 hours
Magnetic Particle Inspect per ASTM E1444
Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2
Embrittle relief at 375° for 8 hours, Chromate Treat
Possible Supplier: Southwest United Industries
Ensure Certificate of Conformity is attached

CZ14/02/20 @

160

Receive & Inspect for Damage & Mat'l Certs

0.00

160

Packaging

Memo

0.00

Packaging

Ensure certificate of conformity is attached

44/3/11 @

170

QC5- Inspect part completeness to step on W/O

0.00

170

QC

Memo

0.00

Quality Control

SW
4/3/13

December-17-13 9:15:07 AM

110105

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Accept

N900040100

Setup Start *NS1*

Stop *NS2*

Start Date: 12/17/13 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 12/17/13 **Req'd Qty:** 1.00 ***1***

Customer:

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Run Start *NR1*

QC:	Date:	SPC (Y/N):	Date:
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Stop *NR2*

Operation Description

Set Up/ Run Hours

Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
---------	--------	-----------	------------	------------	---------------	-------------

174

Outsource process - NDT per QSI038 4.1

0.00

174

Outsource2

Memo

0.00

Outsource process - NDT

ISSUE P/O TO ~~ACCUREN~~:

176

Receive & Inspect for Damage & Mat'l Certs

0.00

176

Packaging

Memo

0.00

Packaging

178

QC5- Inspect part completeness to step on W/O

0.00

178

QC

Memo

0.00

Quality Control

Work Order ID 110105

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Item ID: D350-748-201

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Aft Crosstube

Start Date: 12/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 12/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Run Start

NR1

Approvals: Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Stop

NR2

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

180

0.00

180

SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside crosstube as per QSI 005 4.2

BATCH: 126843

2-Paint Outside of Tube as per Dart QSI 005 4.2

BATCH: M128330

1 CR-1403-15

190

QC14- Inspect Spray Paint

0.00

190

QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

SM
12/13/17

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Item ID: D350-748-201

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Aft Crosstube

Start Date: 12/17/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 12/17/13 Req'd Qty: 1.00

1

Customer:

Reference:

Run Start

NR1

Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop

NR2

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

200

0.00

200

Crosstubes

Crosstubes

Memo

0.00

INSTALL GROUND WIRE INSERT, THEN INSERT SCREW AND WASHER

1-Abrade mating surfaces of support and crosstube with 180 grit sandpaper, clean the area with MEK or equivalent as per dwg

2-Install supports with Proseal 890 per D350-748-241 and QSI 015

A/R Proseal 890

Batch: 127662
EXP: 4/14

3-Install supports clamps Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN-LBS.

PROSEAL CURE TIME 72 HOURS:

Start: 11:00

Finish: 11:30

210

QC5- Inspect part completeness to step on W/O

0.00

210

QC

Memo

0.00

Quality Control

RE-CHECK TORCQUE ON CLAMP AFTER PROSEAL HAS CURED FOR 72HOURS AS PER DWG.

CR 14-03-16

M/19

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Item ID: D350-748-201

Accept

N9000040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube

Start Date: 12/17/13 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 12/17/13 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

220	Pick Kit	0.00							
-----	----------	------	--	--	--	--	--	--	--

220

Packaging Memo

Packaging

230	QC4- 100% Inspect kits for completeness	0.00							
-----	---	------	--	--	--	--	--	--	--

230

QC Memo

Quality Control

240	Packaging	0.00							
-----	-----------	------	--	--	--	--	--	--	--

240

Packaging Memo

Packaging

Identify and pack for shipping as per PPPD350-748-201

Location: _____

PPP Rev: _____

Ship

DAS 26 9-89

DAS 06 9-89

DAS 31 9-89 14-03-20

DAS 06 9-89

MAR 20 2014

Picklist Print

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Page 1

Work Order ID: 110105
Parent Item: D350-748-201
Parent Item Name: Aft Crosstube

Start Date: 12/17/13 Required Date: 12/17/13
Start Qty: 1.00 Required Qty: 1.00

Comments: IPP Rev: A New Issue 06-07-05 JLM
IPP Rev: B Update qty of MS21042L5 06-09-12 KJ
IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD
IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC
IPP Rev: E 08.12.11 Step17 was step 21 KJ Verified by:EC IPP Rev:F 10.08.04 added QSI010
4.3 DD verf:EC IPP REV:G ADD UNDER BEND COMMENT 12-05-28 JLM IPP
REV:H 12.11.05 as per dwg D350-748-141G DD verf:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
ALS4-1032-225 Rivnut		Purchased	No			200	Each	848.0000	1	1		14-3-18	
				<u>Location</u>		<u>Loc Qty</u>	<u>Loc Code</u>						
				FG		30							
				M127028		30							
				ST280		129							
				M125954		20							
				M127028		109							
				st555		689							
				M127092		689							
AN4-41A Bolt		Purchased	No			220	Each	674.0000	8	8		14-3-20	
				<u>Location</u>		<u>Loc Qty</u>	<u>Loc Code</u>						
				ST359		1							
				123346		1							
				ST515		2							
				121185		2							
				ST517		671							
				124241		171							
				124805		315							
				124836		185							

DAS
31
9-89

DAS
26
9-89

Picklist Print

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Page 2

Work Order ID: 110105
Parent Item: D350-748-201
Parent Item Name: Aft Crosstube

Start Date: 12/17/13

Required Date: 12/17/13

Start Qty: 1.00

Required Qty: 1.00

AN4-6A
BOLT

Purchased No

220 Each

1,235.0000

16

16

DAS
26
9-89

DAS
31
9-89

Location

Loc Qty

Loc Code

ST355 282
123355 30
M126175 2
M127410 250
ST514 953
M126317 953

AN5-32A
Bolt

Purchased No

220 Each

267.0000

4

4

DAS
26
9-89

DAS
31
9-89

Location

Loc Qty

Loc Code

st503 267
124215 218
124805 5
m127363 14
m127550 30

D3500-1
Saddle

Manufactured No

220 Each

97.0000

4

4

14-3-19

DAS
26
9-89

DAS
31
9-89

Location

Loc Qty

Loc Code

ST428A 12
95810 12
ST430A 66
108799 40
91888 8
94620 18
ST431 19
95381 19

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Shop Packet Print

Page 2

Picklist Print

December-17-13 9:15:06 AM

Page 3

Work Order ID: 110105
 Parent Item: D350-748-201
 Parent Item Name: Aft Crosstube

Start Date: 12/17/13 Required Date: 12/17/13
 Start Qty: 1.00 Required Qty: 1.00

D3501-1 Manufactured No
 Bushing

220 Each 485.0000 16 16

DAS
 26
 9-89

14-3-19

DAS
 31
 9-89

Location	Loc Qty	Loc Code
ST043	160	
86913	160	
ST051	2	
103038	2	
ST052	323	
104369	80	
105395	90	
105576	40	
88532	1	
95165	112	

16x

D3502-1 Manufactured No
 Support

200 Each 79.0000 2 2

14-3-18

Location	Loc Qty	Loc Code
LG050	79	
104334	6	
73419	3	
74873	1	
86876	1	
88465	24	
94722	20	
97212	12	
99764	12	

③

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Shop Packet Print

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Picklist Print

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Work Order ID: 110105
Parent Item: D350-748-201
Parent Item Name: Aft Crosstube

Start Date: 12/17/13
Start Qty: 1.00

Required Date: 12/17/13
Required Qty: 1.00

D350-748-241TRN
Crosstube Turning Detail

Manufactured No

B105673

110 Each 10.0000

①

1

JW 14-02-04

Location

Loc Qty

Loc Code

LG014

10

103241

1

105672

1

105674

1

105675

1

105677

1

79392

1

86988

1

89962

1

97874

1

97879

1

D3595-063-395
Rubber Cushion

Manufactured No

110958

200 Each 130.0000

2

2

AJ 14-3-18

Location

Loc Qty

Loc Code

FG

5

87353

5

LG051

125

100373

7

102441

6

102890

3

105542

14

108010

36

109481

20

87353

17

94602

1

97526

17

98361

4

②

December-17-13 9:15:07 AM

Shop Packet Print

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December-17-13 9:15:07 AM

Required Qty: 1.00

ty 3 1.00
DAS
26
9-89

DAS
26
9-89

DAS
26
9-89

4x

Picklist Print

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Work Order ID: 110105
Parent Item: D350-748-201
Parent Item Name: Aft Crosstube

Start Date: 12/17/13 Required Date: 12/17/13
Start Qty: 1.00 Required Qty: 1.00

MS21920-22 20
Clamp

Purchased No

200 Each 103.0000 2 2

AS 14-3-18

Location 127225

Loc Qty

Loc Code

LG050	103
125487	5
M126420	4
M126637	4
M127255	40
M127608	50

②

MS27039-1-10
SCREW

Purchased No

200 Each 382.0000 1 1

AS 14-3-18

Location 127993

Loc Qty

Loc Code

GA	100
120449	100
ST305	26
122815	1
123522	18
125654	7
ST506	256
124326	10
m126474	246

② → scrap

①

NAS1149D0363J
Washer

Purchased No

200 Each 4,179.0000 1 1

AS 14-3-18

Location

Loc Qty

Loc Code

GA	89
124392	89
ST294	11
113068	11
ST510a	4079
m126319	4079

①

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Shop Packet Print

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Picklist Print

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Work Order ID: 110105
 Parent Item: D350-748-201
 Parent Item Name: Aft Crosstube

Start Date: 12/17/13 Required Date: 12/17/13
 Start Qty: 1.00 Required Qty: 1.00

NAS1149D0463J Purchased No
 WASHER

220 Each 5,122.0000 32. (32) m127813 DAS 26 9-89

DAS
 31
 9-89

Location	Loc Qty	Loc Code
ST294	143	
119097	1	
121912	24	
124198	35	
124778	83	
ST510a	4979	
M126221	22	
M127693	4957	

NAS1149D0563J Purchased No
 Washer

220 Each 4,123.0000 8 8 14-3-19 DAS 26 9-89

DAS
 31
 9-89

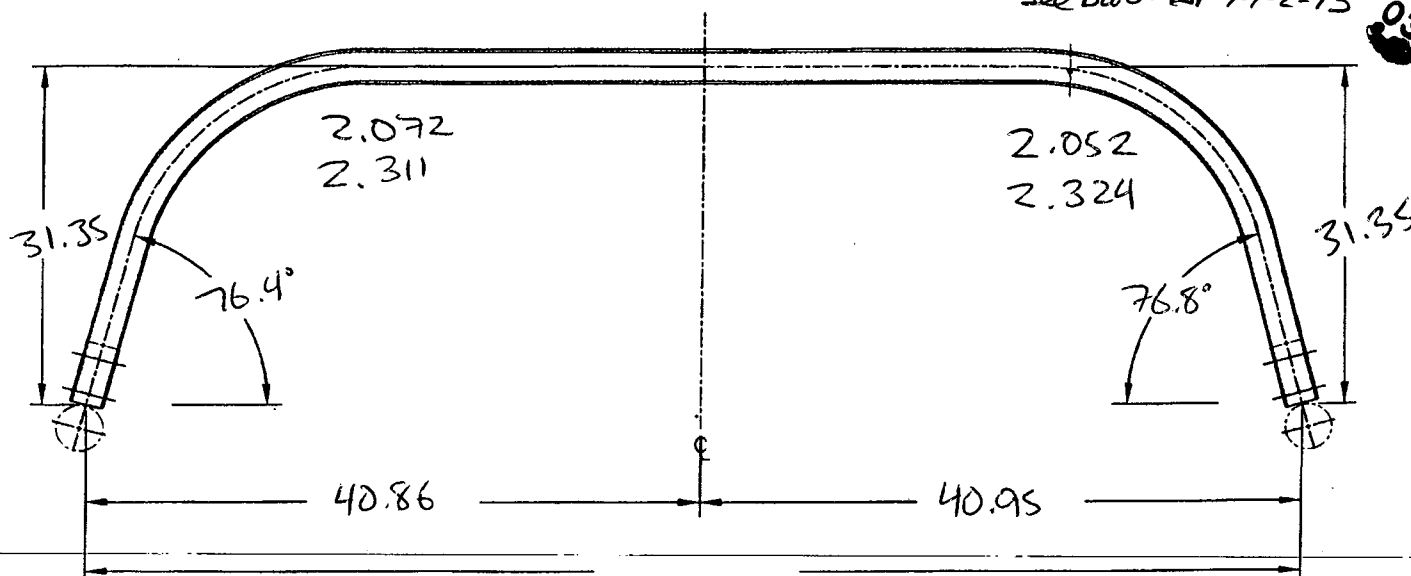
Location	Loc Qty	Loc Code
GA	35	
m125807	35	
ST294	145	
122452	91	
123248	42	
123355	12	
ST510a	3943	
m126319	3943	

EX

DART AEROSPACE LTD	Work Order:	110105
Description: Crosstube High Aft (AS350/355)	Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: G		Page 1 of 1

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06
Bending Passes	7	--
Crushing	--	6%
Twist	--	0.25

See Dwg. DP 14-2-13



	Side A	Side B
Bending Passes	38	40
Crushing	5.5%	5.5%
Comments		
Twist	0.25 0.246	

QC15 Inspection	DP 14-2-13
Date	14-2-13

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	12.04.16	Added bending, crushing & twist dimensions	KJ	
D	12.07.31	Dwg Rev updated	KJ	
E	13.02.27	Dwg Rev updated	KJ	

Item	Qty -241	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6015-125	CROSSTUBE (OR D6018-125)
3	2	D3502-1	SUPPORT
4	2	D3595-063-395	RUBBER CUSHION
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-22 OR MS21920-21	CLAMP (PER DART SPEC. M-MS21920-21/-22)
8	1	MS27039-1-10	SCREW
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6018-125
FINISHED LENGTH AFTER TURNING = 124.70 ± 0.06 (AFTER BENDING/TRIMMING = 122.70 REF)
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS2759/1E AFTER TURNING. ACCEPTABLE TO VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.

BENDING

- 12) ALL DIMENSIONS FOR BENT TUBE ARE POST STRESS RELIEF
- 13) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 7% ON BOTTOM HALF OF BEND.
- 14) MAX AMPLITUDE OF RIBBLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 15) AFTER BENDING, STRESS RELIEVE TUBE AT $650^{\circ}\text{F} \pm 0.25^{\circ}\text{F}$ FOR A MINIMUM OF 2 HRS AND ALLOW TO COOL TO AMBIENT TEMPERATURE (REF AMS2759/1E).
- 16) MAX TWIST AFTER STRESS RELIEF: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 17) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 18) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

110105 MCT
13-12-19

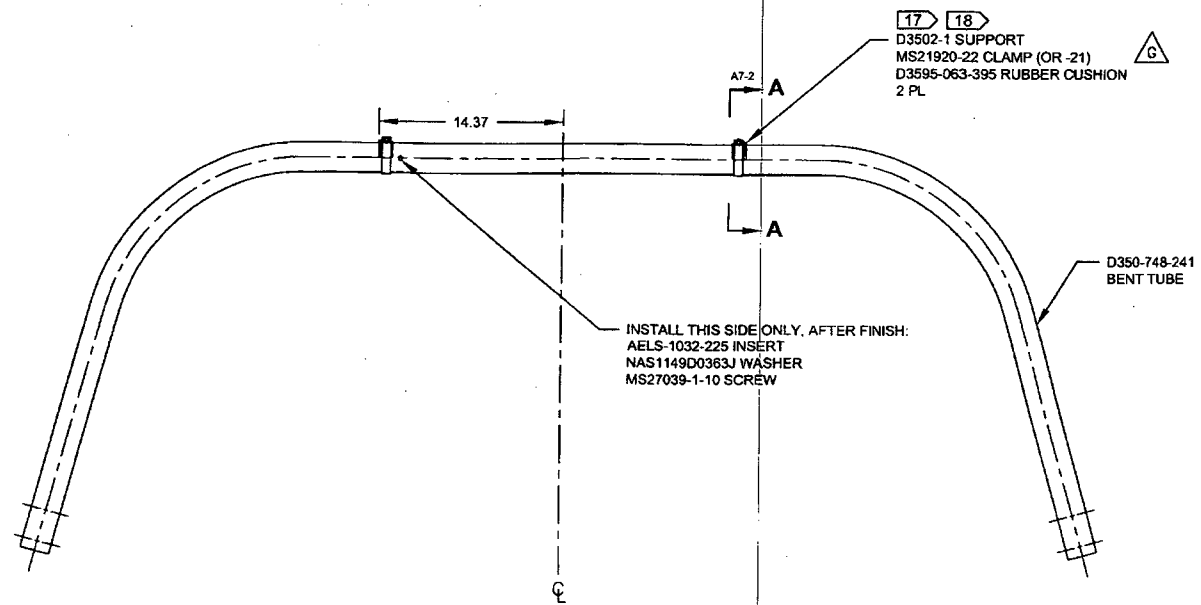
RELEASE
2012-11-01

G	RMV ABRASION STRIP, SUPPORT NOW W/ PROSEAL & CUSHION, ADD STRESS RELIEF, LONGER CUFF, NOW TRIMD AFTER BEND, ADD WALL DIMS & UPDATE TOL.	CP	12.09.12
F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES: UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C6-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	12.09.12		
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. D350-748-241 SHEET 1 OF 4 TITLE CROSSTUBE (AS 350/355 HI AFT) SCALE NTS REV. G COPYRIGHT © 2008 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.			

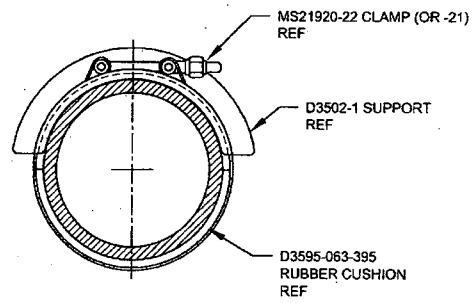
8 7 6 5 4 3 2 1

D
C
B
A

D
C
B
A



**D350-748-241
ASSEMBLY DETAIL**

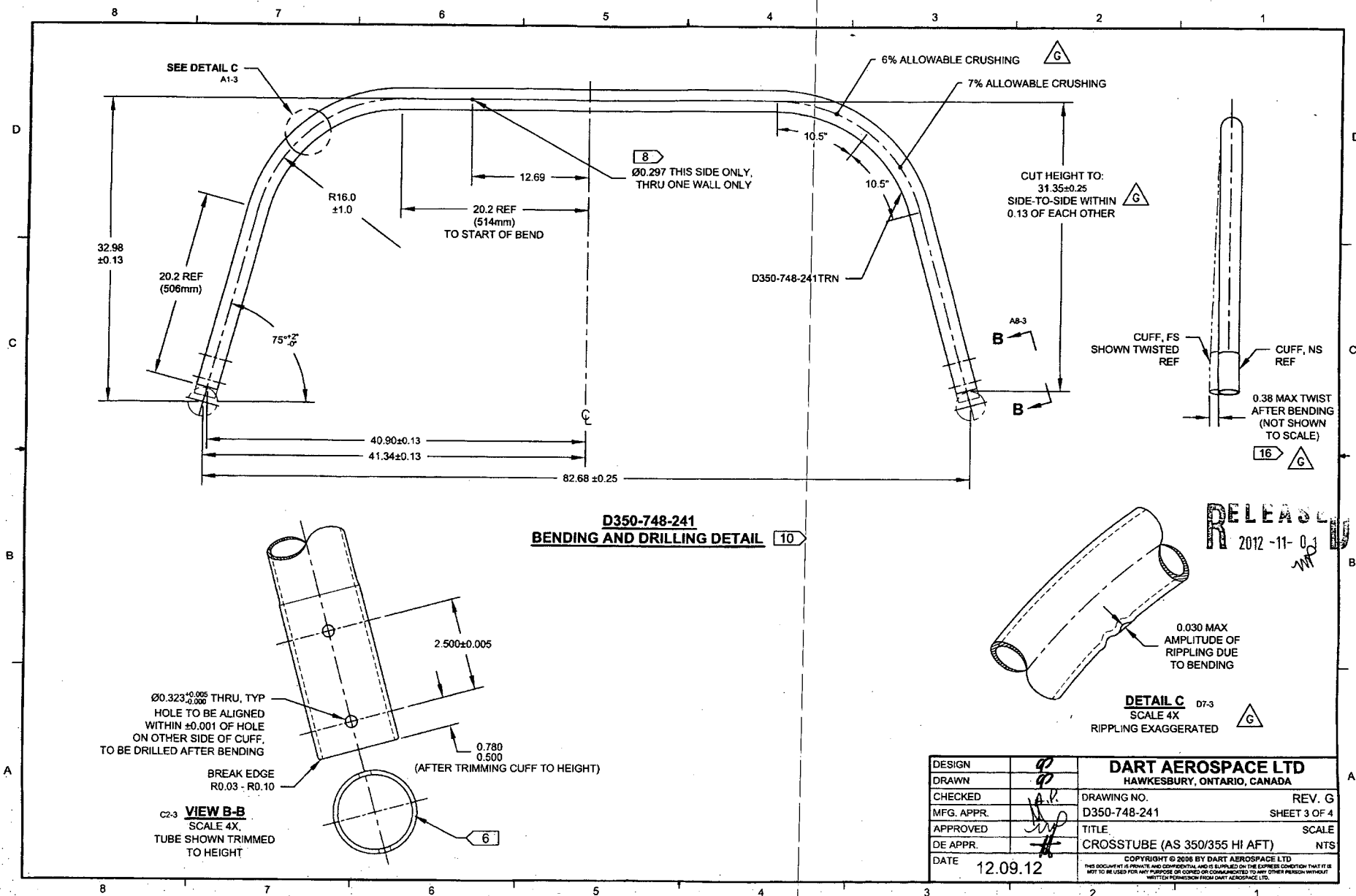


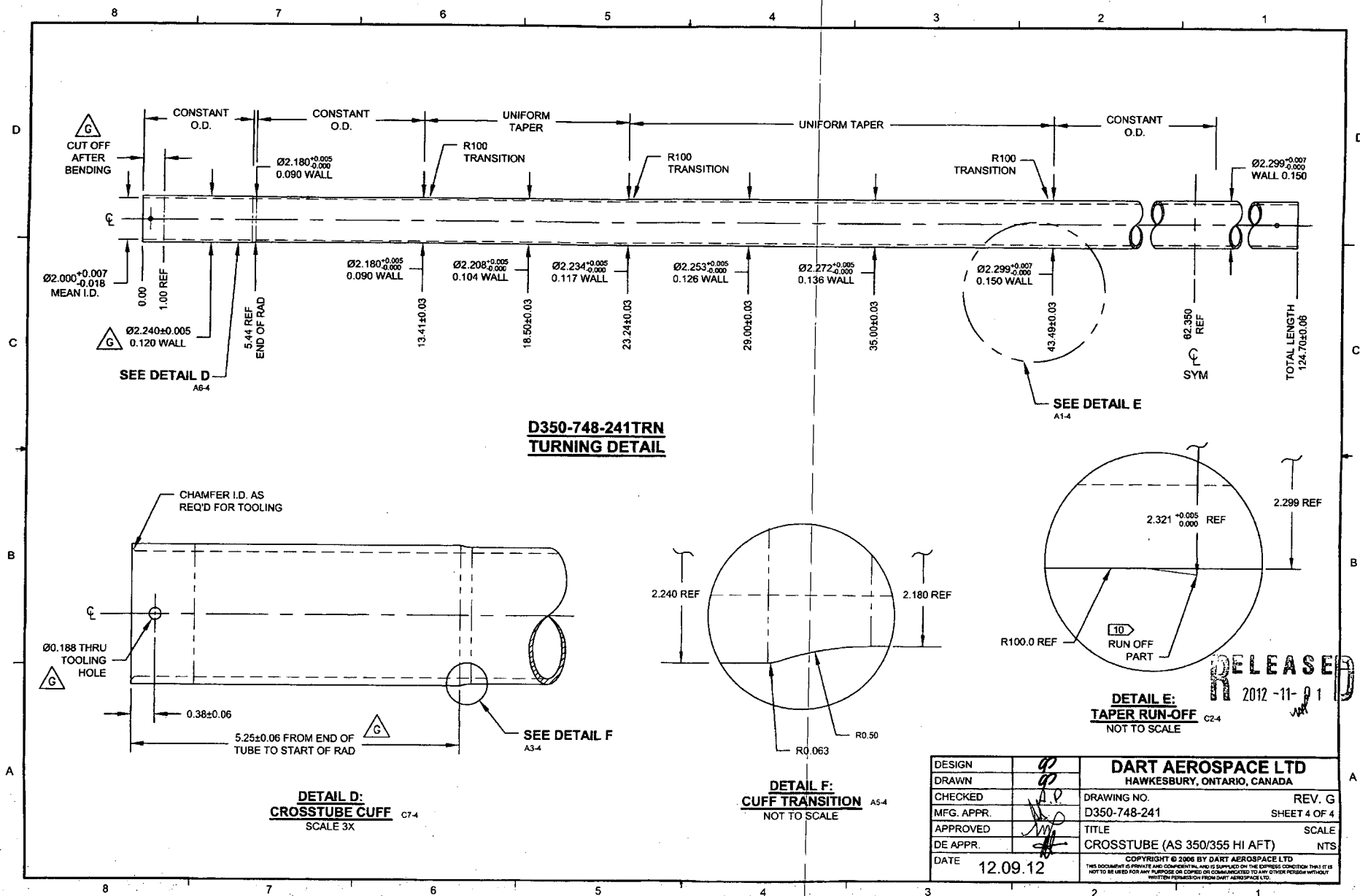
SECTION A-A D4-2
SCALE 6X

RELEASED
2012-11-01
MHP

DESIGN	9	DART AEROSPACE LTD	
DRAWN	9	HAWKESBURY, ONTARIO, CANADA	
CHECKED	A	DRAWING NO.	REV. G
MFG. APPR.	JP	D350-748-241	SHEET 2 OF 4
APPROVED	JP	TITLE	SCALE
DE APPR.	JP	CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	12.09.12	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

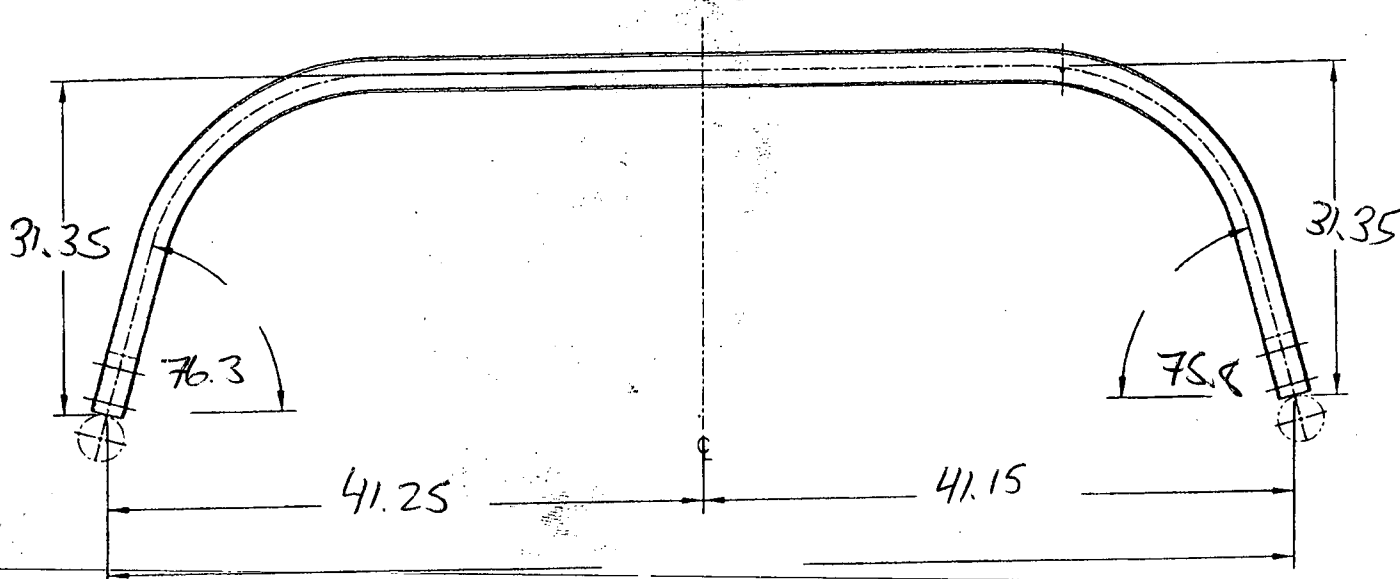
8 7 6 5 4 3 2 1





DART AEROSPACE LTD		Work Order:	
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: F		Page 1 of 1	

Required Dimension	Min	Max
Height	23.12	23.38
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.55	82.05
Bending Passes	7	--
Crushing	--	6%
Twist	--	0.25



	Side A	Side B
Bending Passes	38	40
Crushing		
Comments		
twist	0.230	

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	
D	12.04.16	Added bending, crushing & twist dimensions	KJ	UP

METCOR INC.

560 BOUL. ARTHUR-SAUVÉ, ST-EUSTACHE, QC, J7R 5A8

Tél.: 450-473-1884

Télécopieur / Fax administration: 450-491-5498

Télécopieur / Fax production: 450 491-6454

Certificat de Conformité Détaillé

Detailed Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
193071	1

CLIENT / customer 215

DART AEROSPACE

1270 ABERDEEN

HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE

1270 ABERDEEN

HAWKESBURY

ON K6A 1K7

1

COMMANDE DU CLIENT customer po	BON DE LIVRAISON DU CLIENT customer shipper no.	MATÉRIEL material	CODE DE TRAITEMENT mat'l heat code	NUMÉRO DE LOT lot number
22884		Steel		
SPÉCIFICATIONS DU PROCÉDÉ processing specifications				
STRESS REL				
SAE AMS 2759/1 REV.E				
EXIGENCE / requirement SPÉCIFICATIONS / specified TESTS EXÉCUTÉS / performed RÉSULTATS DE TESTS / results				
Visual				
QUANTITÉ quantity	POIDS weight	DESCRIPTION DES PIÈCES parts description		
3	90	D350-748-201 (1) D350-748-201 CROSSTUBE REF.110110 (1) D350-748-201 REF.110707 (1) D350-748-201 REF.110105 1 NIL		

COMMENTAIRES / comments

STRESS RELIEF 343C, 2 HRS


Le traitement thermique (TT) a été fait en utilisant des équipements en conformité avec AMS2759.

Le TT a été fait tel que requis par AMS2759 et toutes les vérifications et les tests demandés ont été faites et documentés. Aucun changement n'a été fait par rapport au TT. On certifie que le matériel a été fabriqué, échantillonné, testé et inspecté en accord avec AMS2759 et le bon de commande et le matériel rencontre les exigences spécifiées.

Heat treatment (HT) was performed with equipment that meets the requirements of AMS2759.

All HT operations were in compliance with AMS2759 and all verifications have been performed and documented. No unauthorized changes were performed in regards to the HT. We certify that the material was manufactured, sampled, tested and inspected in accordance with AMS2759 and the purchase order and was found to meet the requirements.

APPROUVÉ par / Approved by:



Isabel Otero
QA Technician



DATE: 2014-02-05



Metcor Inc.
METCOR INC.

560, rue Arthur-Sauvé, St-Eustache, Québec J7R 5A8
Tél. 450-473-1884

Télécopieur / Fax administration 450-491-5498
Télécopieur / Fax production 450-491-6454

Tél. : 450-473-1884

Télécopieur / Fax administration: 450-491-5498

Télécopieur / Fax production: 450-491-6454

Rapport d'Inspection

Inspection Report

BON DE TRAVAIL order	CHARGEMENT load
193071	1

CLIENT / customer 215

DART AEROSPACE

1270 ABERDEEN

HAWKESBURY

ON K8A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE

1270 ABERDEEN

HAWKESBURY

ON K8A 1K7

COMMANDE DU CLIENT customer po	BON DE LIVRAISON DU CLIENT customer shipper no.	MATÉRIEL material	CODE DE TRAITEMENT mat'l heat code	NUMÉRO DE LOT lot number
22884		Steel		

SPÉCIFICATIONS DU PROCÉDÉ

processing specifications

STRESS REL

SAE AMS 2759/1 REV.E

EXIGENCE / requirement SPÉCIFICATIONS / specified TESTS EXÉCUTÉS / performed RÉSULTATS DE TESTS / results

Visual

QUANTITÉ quantity	POIDS weight	DESCRIPTION DES PIÈCES parts description
3	90	D350-748-201 (1) D350-748-201 CROSSTUBE REF.110110 (1) D350-748-201 REF.110707 (1) D350-748-201 REF.110105 1 NIL

S. F. P.

COMMENTAIRES / comments

APPROUVÉ par / Approved by:



DATE: 2014-02-05

Packing Slip



Cadorath Coating

2150 Logan Avenue, Winnipeg, Manitoba R2R-0J2

Phone: (204) 633-9420 Fax: (204) 633-8033

INVOICE NUMBER:

S 69983

Sold To:

Dart Aerospace Ltd.
1270 Aberdeen St.

Hawksbury, ON K6A 1K7

ShipTo:

Net 2% Interest Per Month charged on Overdue Accounts.

Any claims for shortages, overcharges, or damaged goods must be made within seven (7) days from receipt of goods.

Customer Order #:	Date Received:	Terms:	G.S.T. #:	Ship Via:	Ship Date:
PO23080	Mar-03-2014	NET 30 DAYS	10071 6547 RT0001		Mar-07-2014

Item # Qty P/N & Description

1	1 EA	CROSSTUBE	S/N 110173
		P/N d350-748-101	W/O 133200
2	1 EA	CROSSTUBE	S/N 110174
		P/N d350-748-101	W/O 133201
3	1 EA	CROSSTUBE	S/N 102808
		P/N D350-748-201	W/O 133202
4	1 EA	CROSSTUBE	S/N 110707
		P/N D350-748-201	W/O 133203
5	1 EA	CROSSTUBE	S/N 111460
		P/N D350-748-201	W/O 133204
6	1 EA	CROSSTUBE	S/N 110110
		P/N D350-748-201	W/O 133205
7	1 EA	CROSSTUBE	S/N 110105
		P/N D350-748-201	W/O 133206
8	1 EA	CROSSTUBE	S/N 106692
		P/N D350-748-201	W/O 133207

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Mar-07-2014

CONSIGNEE TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 133206

INVOICE #: 69983

**CONTRACT OR
PURCHASE ORDER # PO23080**

DESCRIPTION: CROSSTUBE

QTY 1

P/N # D350-748-201

S/N # 110105

STRIP IAW MIL-STD-871. MPI IAW ASTM-E-1444. CADMIUM PLATING
IAW AMS-QQ-P-416C TYPE 2 YELLOW CLASS 1. FINAL MPI IAW
ASTM-E-1444. BAKE HEAT CHART # 14-189 AND # 14-204.

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**



Approved Inspector:

A handwritten signature in black ink, appearing to be 'J. [unclear]', written over a horizontal line.

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework <input checked="" type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Suspected Unapproved <input type="checkbox"/>	AGAINST DEPARTMENT/PROCESS <table style="width:100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>	
Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>															
Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>															
Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>															
Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>																

Root Cause		Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design		14/3/14	200	1	CLAMPS ARE BOTTOMING OUT	UP 14/3/14	USE M521420-20 CLAMPS	AJ 14-3-19		
Doc/Data										
Equip/Tooling										
Handling/Pre										
Material										
Operator										
Offset/Setup										
Process										
Supplier										
Training										
Transport										
Unapproved										

FAULT CATEGORY			
Landing Gear <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric <input type="checkbox"/> Cracks <input type="checkbox"/> Crimp/Kink/Ripple/Wave <input type="checkbox"/> Cuffs <input type="checkbox"/> Crushing <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Marks/Chatter <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube	General <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damage/Defect <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drawing <input type="checkbox"/> Drill Holes <input type="checkbox"/> Finish <input type="checkbox"/> Fit/Function	<input type="checkbox"/> Folio/Program <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete/Unqualified <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Misaligned/off center <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Off-set <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence	<input type="checkbox"/> Outside Dimensions <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Set-up <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Other _____ _____ _____



skyservice

Work Order Traveler
Sky Service F.B.O. Inc.

Page: 1 of 2

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO20196	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 23335
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN: 0	CSN: 0	TSO: 0	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT INSPECTION (LIQUID PENETRANT) ON 14 CROSSTUBES:

ID#: D350-748-201 AFT CROSSTUBE - HIGH

- 1 - WORK ORDER ID#: 102808
- 2 - WORK ORDER ID#: 110105
- 3 - WORK ORDER ID#: 110110
- 4 - WORK ORDER ID#: 111460
- 5 - WORK ORDER ID#: 110707

ID#: D212-664-201 AFT CROSSTUBE - HIGH

- 6 - WORK ORDER ID#: 114476
- 7 - WORK ORDER ID#: 114477
- 8 - WORK ORDER ID#: 114478
- 9 - WORK ORDER ID#: 114479

ID#: D350-748-101 FWD CROSSTUBE

- 10 - WORK ORDER ID#: 110174
- 11 - WORK ORDER ID#: 110173

ID#: D407-667-105 FWD CROSSTUBE

- 12 - WORK ORDER ID#: 114428
- 13 - WORK ORDER ID#: 112868
- 14 - WORK ORDER ID#: 112869

Action Taken:	Date:	Initial/Stamp:				
LIQUID PENETRANT INSPECTION CARRIED OUT ON ITEMS LISTED ABOVE (ITEMS 1-14) AS PER ASTM1417M-13 NO CRACK FOUND Pen: ZL-56 BATCH# 09H094 EXP. DATE: AUG 2014, DEV: SKD-S2 EXP. DATE: OCT2017 CLEANER: SKC-S EXP. DATE: APR 2018	<div>DOT-APP 177 53-89</div> 12-MARCH 2014	<div>DOT-APP 177 53-89</div> [Signature]				
Description	Location	P/N	Qty	Batch	S/N Off	S/N On

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature:	ACA/SCA Stamp	Date:
Name: ANTONINO MARCKETTA	<div>DOT-APP 177 53-89</div>	12-MARCH 2014

Work Order ID 110105

December-17-13 9:15:07 AM

110105

Page 1

Item ID: D350-748-201

Revision ID:

Item Name: Aft Crosstube

Start Date: 12/17/13 Start Qty: 1.00

Required Date: 12/17/13 Req'd Qty: 1.00

Reference:

Accept

N900040100

Setup Start *NS1*

Stop *NS2*

Cust Item ID:

Customer:

Approvals:

Process Plan: MLS

Date: 13-12-19

Tooling:

Date:

Run Start *NR1*

QC:

Date:

SPC (Y/N):

Date:

Stop *NR2*

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D350-748-241

G

100

100

DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile & type labels per PPPD350-748-201 CHG003

0.00

0.00

MLS 14-03-20

110

110

CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

****UNDER BEND .225" PER SIDE*****

****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS****

0.00

0.00

JW 14-02-04